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A redescription of *Abrolophus silesiacus* (HAITLINGER, 1986) with notes on some other *Abrolophus* species (Acari, Prostigmata, Erythraeidae)

Ryszard HAITLINGER & Dariusz ŁUPICKI

A b s t r a c t : Larvae of *Abrolophus silesiacus* are redescribed and the neotype is designated. *A. amilberti* and *A. kotorensis* are synonymized with *A. silesiacus.* New localities and new measurements are given for *A. silesiacus A. anzelmi* and *A. dagmarae*. *A. dagmarae* and *A. silesiacus* are not synonyms of *A. norvegicus*. *A. dagmarae* is new to the fauna of Madeira and *A. norvegicus* is new to the fauna of Sicily.

K e y w o r d s : Taxonomy, *Abrolophus silesiacus*, *A. dagmarae*, *A. norvegicus*, *A. anzelmi*, redescription, synonymization, new records, Sicily.

Introduction

Abrolophus silesiacus (HAITLINGER, 1986) was described from Poland based on a single specimen. The description was very short and incomplete. Drawings were restricted only to scutum, palp and part of ventral side of idiosoma (HAITLINGER 1986). Later further three specimens were colleted in Poland, 9 specimens in Slovakia and one specimen has been collected in France (HAITLINGER 1987, 2002a, 2003, 2007a). Standard measurements, based on 4 specimens from Poland and 3 specimens from Slovakia, were given by HAITLINGER (2007b). Now, new localities for *A. silesiacus*, *A, dagmarae* and *A. anzelmi* in Sicily are given. Recently *A. silesiacus* was synonymized with *A. norvegicus* (THOR 1900) (WOLTHMANN & MĄKOL 2012, MĄKOL & WOHLTMANN 2012). *A. dagmarae* (HAITLINGER, 2012) was described from Sicily based on 5 larvae (HAITLINGER 2012). Also this species was synonymized with *A. norvegicus* (WOHLTMANN & MĄKOL 2012, MĄKOL & WOHLTMANN 2012). In this paper a redescription of *A. silesiacus*, based on neotype, is given (holotype is lost). *A. silesiacus* and *A. dagmarae*, both good species, are compared with *A. norvegicus* and characters differing these species are given. *A. amilberti* (HAITLINGER, 2010) and *A. kotorensis* (HAITLINGER, 2007) are synonymized with *A. silesiacus*.

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Material and methods

In this paper 67 larvae of *A. silesiacus* from nine countries, 10 larvae of *A. dagnarae* from Sicily, 3 larvae from Madeira and 33 larvae of *A. norvegicus* from Austria, Belgium, Czech Republic, Denmark, Estonia, Germany, Latvia, Liechtenstein, Lithuania, Moldova, Norway, Poland, Russia, Sicily, Slovakia and Sweden were studied. All larvae were collected by R. HAITLINGER in the period 1985-2014. Measurements (in micrometers µm) were made using a microscope NIKON Eclipse 80i. Figures were drawings using the same microscope. The terminology and abbreviations follow HAITLINGER (1999, 2013) and WOHLTMANN et al. (2007). The neotype of *A. silesiacus* is deposited in Museum of Natural History, Wrocław University (MNHWU), Poland.

Results

Family E r y t h r a e i d a e ROBINEAU-DESVOIDY, 1828

Abrolophus silesiacus (HAITLINGER, 1986)
Abrolophus kotorensis (HAITLINGER, 2007) syn. nov.
Abrolophus amilberti (HAITLINGER, 2010) syn, nov.

D i a g n o s i s : fD.74 (72-78), fV 22 (20-28), Ta I 62 (60-70), Ti III 87 (86-97), AL. 37 (32-42), L 82 (76-90), W 63 (62-72), odontus (OD) divided to about ⅓-½ its length, paradontus (Prd) not divergent.

In Sicily this species (as *A. kotorensis*) was known from five localities (HAITLINGER 2012). New localities are mentioned below.

M a t e r i a l e x a m i n e d : Larvae collected from herbaceous plants, 20 June1993 in Stolec n. Ząbkowice, Lower Silesia, Poland is designated as neotype. It is deposited in MNHWU; leg. R. Haitlinger. Sicily, 3 km west of Corleone, one larva, 11 May 2010, Cantenuovo di Sicilia, five larvae, 4 May 2012, Salaparuta, one larva, 24 April 2012, Lago Villa Rosa, two larvae, 4 May 2012, Punta Zabbi, one larva, 19 April 2012, Bolognetta, one larva, 30 April 2012, Santa Margherita, one larva, 24 April 2012, Cefalu, one larva, 15 April 2012, 3 km north of Geraci, one larva, 2 May 2015, Giangi, two larvae, 9 May 2014, Piana di Albanesi, two larvae, 11 May 2014, Mendoza n. Trapani, one larva, 17 May 2014, 3 km west of Roccapalumba, two larvae, 10 May 2014, Graniti, one larva, 6 May 2014, 3 km west of Bivona, one larva, 11 May 2014; leg. R. HAITLINGER.

D i s t r i b u t i o n : Croatia, France, Greece, Italy, Montenegro, Poland, Slovakia, Slovenia, Turkey (HAITLINGER 1986, 2002, 2003, 2007a, BERON 2008). First record from Montenegro.

D e s c r i p t i o n (larva): Dorsum with 74 (72-78) weakly barbed setae.(two pairs of setae on scutum level. Laterally of scutum one pair of eyes (Fig. 1). Scutum longer than wide with pair of weakly barbed scutalae, AL < PL, Anterior sensillary setae (ASE) shorter than the posterior ones (PSE), both covered with setules in distal part of the shaft (Fig. 3).

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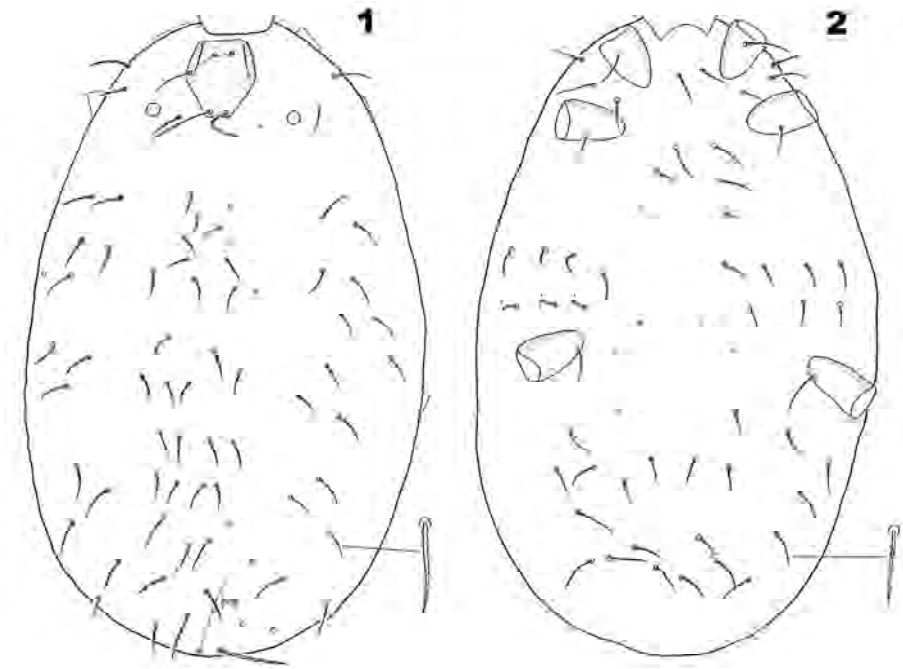

Figs. 1-2. *Abrolophus silesiacus* (HAITLINGER, 1986) (**1**) idiosoma, dorsal view; (**2**) idiosoma, ventral view.

Ventral surface of idiosoma with setae *1a* between coxae I, setae *2a* betwen coxae II and setae *3a* between coxae III. Between coxae I and II 6 setae, between coxae II and III 20 (24) setae and beyond coxae III 22 (20-28); all these setae are weakly barbed. Coxalae *1b* > *2b*; setae *2b* and *3b* subequal in length, all barbed (Fig. 2).

Gnathosoma with a pair of nude adoral setae *cs* 22; long (17-27), a pair of short club-shaped setae *elcp* 5 (4-6) in lateral position. Ventrally two pairs of nude hypostomal setae *as2* 24 (18-27) and setae *as1* 9 (7-14) and a pair of setulose setae *bs* 44 (37-59) (Fig. 4)..Palpfemur with twosetae, dorsal seta barbed, ventral seta nude, palpgenu with, two barbed setae and one nude seta. Palptibia has narrow 4 (4-5) and short 7 (9-12) para-dontus and two nude setae.(Figs 5, 11). Palptarsus with 1ω, 1ζ and 6 nude setae (Fig. 6). Odontus divided to about ⅓-½ its length, 21 (22-25) long.

Leg setal formula: Leg I: Ta 1ω, 2ζ, 1ε, 1Cp, 24 (7B, 17N); Ti 2φ1κ, 12N; Ge 1σ, 1κ, 11N; Tf 8N; Bf 4N; Tr 2N; Cx 1 (Fig.7). Leg II: Ta 1ω, 2ζ, 1Cp, 21 (10B, 11N), Ti 2φ1κ, 13N; Ge 1σ, 1ķ, 9N; Tf 5N; Bf 4N; Tr 2N; Cx 1 (Fig. 8). Leg III: Ta 1ζ, 19, Ti 1φ, 13N; Ge 1σ, 9N; Tf 5N; Bf 4N; Tr 2N; Cx 1 (Figs 9, 10).

Other specimens (=8): Leg I: Ta 1ω, 2ζ, 1z, 1ε, 20-22, Ti 2φ, 1κ, 11-13; Ge 1σ, 0 (1 specimen)-1κ, 11-12; Tf 7-8; Bf 4; Tr 2; Cx 1.Leg II: Ta 1ω, 2ζ, 1z, 17-19; Ti 2φ, 0 (2 specimens)-1κ, 10-14; Ge 1σ, 0 (5 specimens)-1κ, 9; Tf 5; Bf 4; Tr 2’ Cx 1. Leg III: Ta 1ζ, 14-18; Ti 1φ, 12-13; Ge 1σ, 7-10; Tf 5; Bf 4; Tr 2; Cx 1.

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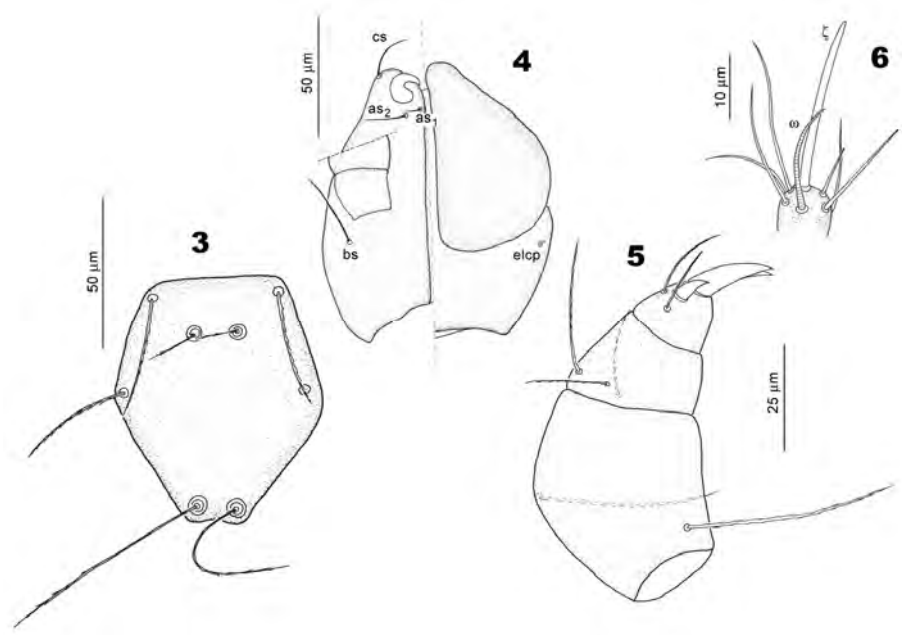

Figs. 3-6. *Abrolophus silesiacus* (HAITLINGER, 1986) (**3**) scutum: (**4**) gnathosoma; (**5**) palp; (**6**) palptarsus.

Leg lengths (including coxa, excluding claws): leg I 413 (409 – 453), leg II 370 (389 – 413), leg III 435 (422 – 475). IP = 1218 (1251 –1334). Metric data are given in Table 1.

R e m a r k s : *A. silesiacus* belongs to the species group having odontus divided to about ⅓-½ of its length. This group includes *A. stanislavae* (HAITLINGER, 1986), *A. podorasensis* (HAITLINGER, 2007), *A. sardiniensis* (HAITLINGER, 2007), and *A. dagmarae* (HAITLINGER 2012) (HAITLINGER 1986, 2007a, c, 2012). It differs from *A. stanislavae* and *A. podorasensis* in not divided paradontus. From *A. dagmarae* it differs in the longer L (68-89 vs. 48-67), AP (26-40 vs. 14-18), thinner Prd (W) (3-5 vs. 8-11), and fD (72-78 vs. 38) and from *A. sardiniensis* in.fD (72-78 vs. 44), the longer L (68-89 vs. 54), W (56-74 vs. 48), PW (48-66 vs. 42), AP (26-40 vs.12), AL (23-43 vs. 18), GL (98-125 vs. 88), 1a 24-46 vs. 14), PsFd (38-55 vs. 20), Ti I (63-84 vs. 54) and Ti III (70-101 vs. 48).

Recently *A. silesiacus* was synonymized with *A. norvegicus* by WOHLTMANN & MĄKOL (2012). In their paper decision about synonymization *A. silesiacus* with *A. norvegicus* is restricted to following statesment: "we have had an opportunity of studying the other specimen assigned to *A. silesiacus* and both, in the case of data provided in the original description and those calculated for the specimen at hand – the conspecificity of *H. silesiacus* with *A. norvegicus* is being confirmed". In reality metric data for *A. silesiacus* in majority are identical with *A. norvegicus*. (HAITLINGER, 1986, 2007b and Table 1). The following main characters differs *A. silesiacus* with *A. norvegicus*: odontus (OD) divided to about ⅓- ½ of its length vs. OD bifurcate at termination (~⅛ its length), narrow

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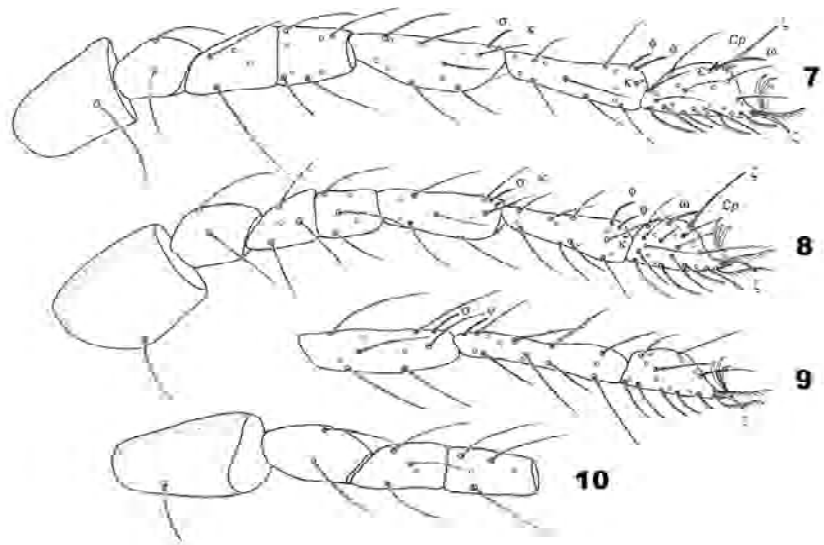
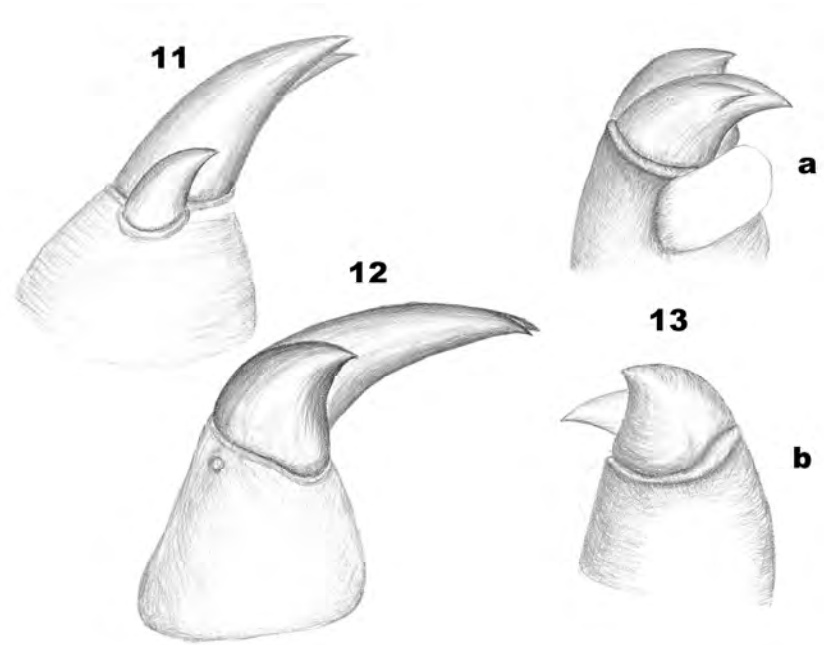


Figs. 7-10. *Abrolophus silesiacus* (HAITLINGER, 1986) (**7**) leg I; (**8**) leg II; (**9**) leg III, tarsus-genu; (**10**) leg III, telofemur-coxa.



Figs. 11-13a, b. Odontus and paradontus. (**11**) *Abrolophus silesiacus*; (**12**) *A. norvegicus*; (**13a**) *A. dagmarae*, external side; (**13b**) *A. dagmarae*, ventral side.

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paradontus Prd (W) (4-5 vs. 9-12), narrow PaFe (W) (31-43 vs. 52-66), PaFe(L)/PaFe(W) (1.26-1.66 vs. 0.85-1.17), PaGe (W) (24-30 vs. 34-42), GL (108-122 vs. 121-154), PW (53-63 vs. 62-80), AP (30-37 vs. 16-23), fD (72-78 vs. 44-54) and *as2* (14-27 vs. 34-60) (Figs 11, 12 1). Above mentioned characters indicate that *A. silesiacus* diametrically differs from *A. norvegicus* and can not be recognized as synonym of *A. norvegicus*. Two species *A. kotorensis* and *A. amilberti* have identical metric and meristic data with *A. silesiacus* and both are synonymized with *A. silesiacus* (Table 1).

Abrolophus dagmarae (HAITLINGER, 2012)

This species was known only from 4 localities in Sicily (HAITLINGER 2012).

New localities: 2 larvae, 21 April 2012, Masteria Cagelotto n. Piana di Albanesi, 1 larva, 17 April 2012, Boletto n. San Giuseppe Jato (Palermo prov.), 1 larva, 24 April 2012, Salaparuta (Trapani prov.), 3 km east of Santo Stefano, 11 May 2014, all from herbaceous plants.

WOHLTMANN & MĄKOL (2012) recognized this species as synonym of *A. norvegicus*. They compared metric and meristic data of both species stated small differences only between 6 metric features. Both species radically differs in the following characters (33 studied specimens of *A. norvegicus* were collected from Andorra, Austria, Belgium, Czech Republic, Denmark, Estonia, Germany, Latvia, Liechtenstein, Lithuania, Moldova, Norway, Poland, Russia, Sicily, Slovakia, Sweden and Ukraine): odontus (OD) divided to about ⅓-½ of its length vs. OD bifurcate at termination (divided ~⅛ its length), the shorter OD, GL, ISD, L, ASE, SB, *cs*, *as1*, PaFe (W), PaGe (W) and PaTi (W) (Table 2). From Madeira 3 specimens were collected mistakely determined as *A. neobrevicollis* ZHANG & GOLDARAZENA 1996 (HAITLINGER 2002b). Later *A. neobrevicollis* was synonymized with *A. norvegicus* (WOHLTMANN & MĄKOL 2012). Specimens from Madeira have typical characters for *A. dagmarae* (Table 3). Now, *A. dagmarae* is known only from Sicily and Madeira and this species is not a synonym of *A. norvegicus*.

Abrolophus norvegicus (THOR, 1900)

Material examined: Sicily, Monreale n. Palermo, 27 may 2014, 1 larva from herbaceous plants.

Distribution: Europe. First record from Sicily.

This species is very common in Europe, but is very rare in Sicily. During four years only one specimen was collected. Measurements of the specimens (for comparison with *A. dagmarae*) are given in Table 3.

Abrolophus anzelmi HAITLINGER & ŁUPICKI, 2013

Material examined: Sicily, Graniti, 6 May 2014, 1 larva; 3 km west of Bivona, 11 May 2014, 1 larva, both from herbaceous plants

This species was described based on a single specimen (HAITLINGER & ŁUPIBKI 2013). Measurements for two other specimens are given in Table. 64 Species known only from Sicily.

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Table 1. Metric data for *Abrolophus silesiacus* (HAITLINGER, 1986) (**1**). *A. kotorensis* (HAITLINGER, 2007) (= *A. silesiacus*) (**2**) and *A. amilberti* (HAITLINGER, 2010) (= *A. silesiacus*) (**3**). H – holotype, N – neotype, P – other specimens.

	1 N	1 P n=34	2 n=20	3 n=12	Range
II	658	288-790	385-814	413-711	288-814
IW	415	203-489	279-580	241-438	203-580
L	82	70-89	68-83	68-80	68-89
W	63	60-74	56-68	56-64	56-74
AW	43	37-51	36-45	38-40	36-51
PW	59	51-66	50-60	48-56	48-66
AA	15	12-17	11-15	8-12	8-17
SB	13	12-16	12-15	10-12	10-16
ISD	57	53-65	45-58	48-54	45-65
AP	33	30-40	26-36	28-36	26-40
AL	37	33-43	23-34	28-34	23-43
PL	44	37-49	31-41	36-42	31-49
ASE	34	30-36	17-38	24-32	17-38
PSE	72	63-80	40-77	45-70	40-80
GL	117	108-125	98-117	98-110	98-125
DS	24-66	23-79	19-66	24-64	19-79
PsFd	53	46-55	38-46	38-52	38-55
PsGd	34	25-41	21-33		21-41
1a	34	31-46	24-39	26-40	24-46
2a	-	31-43	27-38		27-43
3a	30	30-41	20-35		20-41
1b	48	40-61	36-50	40-52	36-61
2b	34	32-44	26-37	24-32	24-44
3b	37	31-43	24-40	28-36	24-43
Ta I	62	61-73	54-67	52-64	52-73
Ti I	75	73-84	63-75	70-82	63-84
Ge I	80	75-87	64-77	70-80	64-87
Tf I	38	34-44	28-40	30-40	28-44
Bf I	46	46-59	38-53	44-48	38-59
Tr I	47	39-51	32-47	36-44	32-51
Cx I	65	60-87	54-68	50-58	50-87

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	1 N	1 P n=34	2 n=20	3 n=12	Range
Ta II	54	55-64	48-59	46-54	46-64
Ti II	64	64-74	54-68	58-72	54-74
Ge II	67	63-72	52-64	64-70	52-72
Tf II	29	29-39	24-43	30-38	24-43
Bf II	40	36-49	34-44	32-52	32-52
Tr II	43	40-51	36-45	38-42	36- 51
Cx II	73	70-87	58-80	60-68	58-87
Ta III	55	55-64	44-59	52-60	44-64
Ti III	87	86-98	70-92	88-104	70-104
Ge III	77	76-88	62-76	72-82	62-88
Tf III	43	38-49	32-45	38-44	32-49
Bf III	46	45-58	36-50	42-56	36-58
Tr III	50	44-55	40-48	38-50	38-55
Cx III	77	66-82	64-78	56-68	56-82
OD	21	21-25	13-19		13-25
Prd (L)	7	9-14	7-10		7-14
Prd (W)	4	4-5	3-5		3-5
PaFe (L)	59	50-62	43-52		43-62
PaFe (W)	38	35-45	27-38		27-45
PaGe (L)	24	21-26	20-25		20-26
PaGe (W)	30	24-32	25-29		24-32
cs	22	12-27			12-27
bs	44	33-59			33-59
as1	9	7-14			7-14
as2	14	18-27			14-27
Leg I	413	401-453	344-408		344-453
Leg II	370	375-413	312-388		312-413
Leg III	435	422-475	360-450		360-475
IP	1218	1209-1334	1026-1231		1026-1334

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Table 2. (**1**) Some differences between *Abrolophus dagmarae* (HAITLINGER, 2012) and (**2**) *A. norvegicus* (THOR, 1900).

	1	2		1	2
PL	34-42	44-63•	*as*2	19-33	34-60•
ISD	40-52	51-72	ASE	22-29	30-50
GL	97-118	120-154	PaFe (W)	27-48	49-66
L	58-67	68-88•	PaGe (W)	25-31	32-42
OD	11-15	18-33•	PaTi (W)	16-17	18-25
SB	10-16	16-21			

• - after WOHLTMANN & MĄKOL (2012) and own data

Table 3. Metric data for *A. dagmarae* from Sicily, **1** – holotype, **2** – other specimens, **3** – Madeira (3n), **4** – *A. norvegicus* – Sicily

	1	2 n=9	3 n=3	Range	4 n=1
IL	832	368-502	353-572	353-832	638
IW	476	216-318	227-358	216-476	446
L	62	58-67	63-67	58-67	81
W	72	60-69	66-69	60-72	81
AW	48	39-42	43-46	39-48	40
PW	66	57-60	60-64	57-66	68
AA	13	10-13	11-15	10-15	16
SB	13	10-16	14-15	10-16	18
ISD	52	40-51	47-49	40-52	57
AP	16	14-18	18-22	14-22	18
AL	32	31-33	25-29	25-33	36
PL	36	34-42	37-42	34-42	--
ASE	23	22	24-29	22-29	37
PSE	56	54-61	52-59	52-61	56
GL	110	102-118	101-104	101-118	124
DS	33-40	28-44	27-53	27-53	47-56
PsFd	33	36-39	37-38	33-39	39
PsGd	31	29-33	29-31	29-33	30
1a	38	29-34	29-30	29-38	38
2a		28-34	30-32	28-34	38
3a		24-30	27-31	24-31	36
1b	46	48-62	53-57	46-62	57
2b		31-34	27-31	27-34	-49
3b		25-30	27-31	25-31	36
Ta I	70	56-66	63-71	56-71	65
Ti I	70	57-66	63-72	57-72	76

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	1	2 n=9	3 n=3	Range	4 n=1
Ge I	63	62-70	65-71	62-71	73
Tf I	32	28-34	33-36	28-36	36
Bf I	46	39-41	49-51	39-51	45
Tr I	39	36-42	37-41	36-42	42
Cx I	52	48-58	53-63	48-63	50
Ta II	59	52-58	55-58	52-59	69
Ti II	59	52-64	60-67	52-67	74
Ge II	63	55-65	55-64	55-65	71
Tf II	28	26-28	30-33	26-33	35
Bf II	40	36-39	36-41	36-41	46
Tr II	45	42-43	42-45	42-45	39
Cx II	68	58-68	68-74	58-74	67
Ta III	61	53-58	55-61	53-61	64
Ti III	87	74-92	85-94	74-94	76
Ge III	75	67-74	69-77	67-77	67
Tf III	39	38-44	39-42	38-44	31
Bf III	45	40-46	44-46	40-46	51
Tr III	40	42-51	37-48	37-51	34
Cx III	57	57-64	67-72	57-72	78
cs	15	11-19	20-22	11-22	20
bs	40	33-42	43-49	33-49	44
as1	10	9-11	7-11	7-11	18
as2	26	27-31	26-33	26-33	27
elcp	4	4-5	4	4-5	
OD	14	11-15	14-15	11-15	21
Prd (L)	8	7-11	8-11	7-11	12
Prd (W)	10	8-11	10-11	8-11	7
PaFe (L)	60	42-62	51-53	42-62	53
PaFe (W)	41	27-47	46-48	27-48	49
PaGe (L)	25	21-27	22-23	21-27	21
PaGe (W)	29	25-31	32-31	25-31	33
PaTi (L)	16	15-17	15-16	15-17	
PaTi (W)	17	16-17	17	16-17	
Leg I	372	335-374	367-397	335-397	387
Leg II	362	327-355	354-374	327-374	401
Leg III	404	381-416	410-434	381-434	421
IP	1138	1043-1121	1131-1203	1043-1203	1209

Table 4. Metric data for *Abrolophus anzelmi* HAITLINGER & ŁUPICKI, 2013

Character	H	1	2	Range	Character	H	1	2	Range
IL	745	345	761	345-761	PaFe(W)		40		
IW	535	230	513	230-535	PaGe(L)		23		
L	81	87	79	79-87	PaGe(W)		25		
W	75	89		75-89	OD		38	30	30-38
AW	58	52	43	43-58	Prd(L)		20	15	15-20
PW	68	57	53	53-68	TaI	106	82	94	82-106
AL	72	69	59	59-72	TiI	156	131	141	131-156
PL	77	68		68-77	GeI	119	107	101	101-119
ASE	40		35	35-40	TfI	63	64	54	54-64
PSE	70		74	70-74	BfI	86	71	70	70-86
ISD	45	57	49	45-57	TrI	64	47	35	35-64
AP	25	29	20	20-29	CxI	79	61	63	61-79
AA	14	14	14	14	TaII	91	76	79	76-91
SB	17	14		14-17	TiII	143	119	110	110-143
GL	183	177	166	166-183	GeII	98	86	85	85-98
DS	43-71	45-67	35-50	35-71	TfII	53	57	44	44-57
PsFd		51	29	29-51	BfII	72	61	47	47-72
PsGd	16	32		16-32	TrII	58	46	46	46-58
1a	125	128		125-128	CxII	95	75	79	75-95
2a		60	59	59-60	TaIII	100	81	81	81-100
3a		40	38	38-40	TiIII	190	167	174	167-190
1b	71	70	61	61-71	GeIII	132	122	109	109-132
2b	48	59		48-59	TfIII	81	76	68	68-81
3b	53	51	44	44-53	BfIII	80	76	57	57-80
cs					TrIII	72	44	43	43-72
as1		30			CxIII	89	68	77	68-89
as2		47			LegI	673	563	563	563-673
bs		44			LegII	610	560	490	490-610
elcp					LegIII	744	634	609	609-744
PaFe(L)		52			IP	2007	1757	1662	1662-2007

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